

REMARKS

By the present amendment, claims 1 to 6 are pending in the application. Claims 1, 2 and 3 are independent claims.

Claim Amendments

Claims 1, 2 and 3 have been amended to change “affect” to --effect-- in response to a rejection under 35 U.S.C. §112, second paragraph.

Claims 1, 2 and 3 have been amended to more clearly specify “precoated” in response to a rejection under 35 U.S.C. §112, second paragraph.

Claims 1, 2 and 3 have been amended to specify --an oxide of metal and/or silicon and a hydroxide of metal and/or silicon-- in response to a rejection under 35 U.S.C. §112, second paragraph.

Support for the phrase --and the pits and/or the cracks are formed by a liquid phase process for imparting the oxide of metal and/or silicon and/or the hydroxide of metal and/or silicon to the metal sheet-- added to claims 1, 2 and 3 may be found in the specification, e.g., at page 11, lines 4-6 and page 14, lines 10-18.

Note that prior dependent claim 6 specified that the oxide or hydroxide is one or more member selected from titanium, zirconium and silicon.

Dependent claim 6 has been amended to delete reference to silicon as being a metal species.

Claim Objections

Claim 6 was objected to under 37 C.F.R. §1.75(c) because of the term “silicon”.

In response to this objection, claims 1, 2, 3 and 6 have been amended by the present amendment as previously discussed.

In view of the present amendment, it is respectfully requested that the objection to claim 6 under 37 C.F.R. §1.75(c) be withdrawn.

§112, ¶2

Claims 1 to 6 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

In response to this rejection, claims 1, 2 and 3 have been amended by the present amendment as previously discussed.

In view of the present amendment, it is respectfully requested that the rejection under 35 U.S.C. §112, second paragraph, be withdrawn.

§102/§103

Claims 1 to 6 were rejected under 35 U.S.C. §102(b) as being anticipated by Japan No. 2001-348678 to Yano et al.

Claims 2 and 5 were rejected under 35 U.S.C. §102(b) as being anticipated by Japan No. 04-032577 to Sato et al.

Claims 4 to 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Japan No. 2001-348678 to Yano et al.

Claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Japan No. 04-032577 to Sato et al.

These rejections, as applied to the amended claims, are respectfully traversed.

The Present Invention

The invention of the present application is characterized in that the cracks, the pits, or the cracks and pits are formed by a liquid phase process for imparting the oxide or hydroxide to the metal sheet, as specified in the amended independent claims. Although an anchoring effect due to irregularity of a coated film surface or a substrate is known, obtaining an anchoring effect due to cracks in a film, pits in a metal sheet, or both formed by a liquid phase process for forming the film on the metal sheet, as in the present invention, is novel and non-obvious over the cited prior art.

Patentability

Yano et al. (JP 2001-348678 A)

Yano et al. discloses a plated film having surface irregularity formed by Ti-Al, Ti-B or Al-B based deposits, or a plated film having surface irregularity formed by controlling growth of crystal grains by means of cooling conditions of a plated material, or a plated film having surface irregularity formed by a mechanical means of one or more of pickling, brushing, dulling and shot blasting after plating.

The cracks of the present invention are formed in a film (a film of metal oxide or hydroxide) on the metal sheet or plated layer and are therefore different from the irregularity in a plated layer of Yano et al.

The pits of the present invention are formed in the metal sheet or plated layer itself, and therefore appear superficially similar to the irregularity of Yano et al. However, the irregularity of Yano et al. represents projections from a plated layer in the case of the deposits based on Ti-Al or the like of claim 2, the projections being different from the pits of the present invention which break into the metal sheet by an etching effect or the like.

The irregularity due to pickling, brushing, dulling or shot blasting of claim 4 of Yano et al. appear superficially similar to the pits of the present invention. However, Yano et al. does not disclose or suggest the formation of pits in a metal sheet by a liquid phase process for the formation of an inorganic film on the metal sheet.

Sato et al. (JP 4-32577 A)

Sato et al. discloses an Al or Al alloy sheet provided with a surface film having a large surface area and containing oxygen. Sato et al. further discloses out that the film may be based on a phosphate or chromate compound or a metal oxide or hydroxide, or may be a film of porous alumite. The film of Sato et al. improves film adhesion and corrosion resistance by an anchoring effect and hydrogen bonding due to the increased surface area.

However, Sato et al. neither discloses nor suggests that the treatments referred to therein, such as chromate, zinc phosphate and alumite treatments, provide pits and cracks as in the present invention. The pits and cracks in the present invention are formed by the liquid phase process, which uses, for example, a solution containing titanium, zirconium and silicon.

Summary

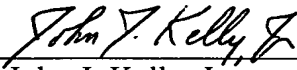
Yano et al. and Sato et al. cited by the Office Action neither disclose nor suggest the invention of the amended independent claims 1-3 of the present application. Thus, the invention of independent claims 1-3, and the dependent claims thereof, is not disclosed or suggested by Yano et al. or Sato et al., alone or in combination, and is patentable over Yano et al. and/or Sato et al.

CONCLUSION

It is submitted that in view of the present amendment and foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application, as amended, be allowed and passed to issue.

Respectfully submitted,

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Dated: November 27, 2007

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